

MATH 1 – Chapter 11

In Chapter 11 the concepts of probability are introduced. Technical terms you need to learn along with their definitions and guidance for practice problems are given below.

- **11.1:** Random phenomenon, Experiment, Outcome, Sample Space, Event, Equally likely outcomes, Theoretical Probability Formula (p.579), Empirical Probability Formula (p.580), The Law of Large Numbers (p.582), Odds (p.584).

Read 11.1. Read the historical background at the beginning of the section. Pay attention to the concept of equally likely outcomes. Read the examples. Gregor Mendel's contributions have an effect on our lives today. Probability in Genetics (p.583) along with Exercises 19–38 educate about you the implications of modern research.

Practice Problems for 11.1: 7, 11, 13, 15, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 43, 59, 63, 65, 67.

- **11.2:** Properties of Probability (p.589), Complement rule (p.590), Addition Rules (p.592), To understand problems involving a *standard deck of cards* see p.549 first.

The basic properties of Probability, Probability of events involving “Not” ($P(\text{not } E) = P(E')$), $P(A \text{ or } B) = P(A \cup B)$ (The Addition Rule), and the Special Addition Rule for mutually exclusive events ($A \text{ and } B = A \cap B = \emptyset$) are treated in 11.2. Go over ALL the worked examples.

Practice Problems for 11.2: 1, 5, 7, 9, 11 (see page 549 if needed), 13, 15, 17, 19, 26–31.

- **11.3:** Conditional Probability (p.596–597), Independent Events (p.597), Multiplication Rules of Probability (p.598), The Birthday Problem (P.602–603)).

The conditional probability of B given A, $P(B|A)$, independence of events, The multiplication rule, and the Birthday problem are discussed in 11.3. See Example 4 for applying probability to tabular data. Go over Examples 6, 7, 9, 10.

Practice Problems for 11.3: 1, 2, 5, 6, 7, 9, 11, 23–32, 51, 53 - 57, 58–61, 67–70.

- **11.4:** Binomial Probability Distribution (p.607–610).
The binomial random variable, its probability distribution, and The Binomial probability formula (p.758), are given in 11.4.
Practice Problems for 11.4: 1, 3, 5, 7, 21, 23, 25, 27, 33, 35, 41, 43.

- **11.5:** Expected Value (p.612–617).

Expected value or the mathematical expectation of a random variable is given in 11.5 with applications. Note that for the Binomial distribution the expectation is np .

Practice Problems for 11.5: 3, 5, 7, 11, 24, 25, 26.

Ch. 11 Test: 3, 5, 6–8, 9, 11, 13, 15, 17, 18, 19, 21, 27, 29.